# Recent Developments and Applications of Quantum Well Infrared Photodetector Focal Plane Arrays

**S. D. Gunapala, S. V. Bandara**

Center for Space Microelectronics Technology, Jet Propulsion Laboratory,
California Institute of Technology, Pasadena, CA 91109, USA

**ABSTRACT**

There are many applications that require long wavelength, large, uniform, reproducible, low cost, stable, and radiation-hard infrared (IR) focal plane arrays (FPAs). For example, the absorption lines of many gas molecules, such as ozone, water, carbon monoxide, carbon dioxide, and nitrous oxide occur in the wavelength region from 3 to 18 micron. Thus, IR imaging systems that operate in the long wavelength IR (LWIR) region (6 - 18 micron) are required in many space borne applications such as monitoring the global atmospheric temperature profiles, relative humidity profiles, cloud characteristics, and the distribution of minor constituents in the atmosphere which are being planned for future NASA Earth and planetary remote sensing systems. Due to higher radiation hardness, lower 1/f noise, and larger array size the GaAs based Quantum Well Infrared Photodetector (QWIP) FPAs are very attractive for such space borne applications compared to intrinsic narrow band gap detector arrays. In this presentation we will discuss the optimization of the detector design, material growth and processing that has culminated in realization of large format long-wavelength QWIP FPAs, portable and miniature LWIR cameras, holding forth great promise for myriad applications in 6-18 micron wavelength range in science, medicine, defense and industry. In addition, we will present some system demonstrations using broadband, two-color, and high quantum efficiency long-wavelength QWIP FPAs.